



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

to turn the thin edge of the semi-lenses of the two cameras in the direction which will produce a bending contrary to that of the semi-lenses of the stereoscope.

Having shown how the lateral proportional distances of any two correspondent points of the two stereoscopic pictures are the indices of their perspective distances, if we were, while looking in the stereoscope, to produce a change in those proportional lateral distances by sliding horizontally in a contrary direction, two pairs of superposed glass photographic pictures, the objects would appear to move, not in the horizontal lateral direction of that change which they naturally have, but in a straight line forward and backward, as if the object was approaching or receding.

But the most curious effect of that motion would be, that the objects would appear increasing in size while they were receding, and diminishing while approaching, which we know is contrary to the rule of perspective. This is another illusion entirely physiological, and the cause of which may be thus explained; while the object appears moving forward and backward it remains always the same size, but as we expect when it moves forward that it should increase in size, and when it moves backward that it should decrease, and as it does not, we feel that it is diminishing when approaching and increasing when receding.

## II. "A Memoir upon Caustics." By ARTHUR CAYLEY, Esq., F.R.S. Received May 1, 1856.

(Abstract.)

The principal object of this memoir, which contains little or nothing that can be considered new in principle, is to collect together the principal results relating to caustics *in plano*, the reflecting or refracting curve being a right line or a circle, and to discuss with more care than appears to have been hitherto bestowed upon the subject, some of the more remarkable cases. The memoir contains in particular researches relating to the caustic by refraction of a circle for parallel rays, the caustic by reflexion of a circle for rays proceeding

from a point, and the caustic by refraction of a circle for rays proceeding from a point; the result in the last case is not worked out, but it is shown how the equation in rectangular coordinates is to be obtained by equating to zero the discriminant of a rational and integral function of the sixth degree. The memoir treats also of the secondary caustic or orthogonal trajectory of the reflected or refracted rays in the general case of a reflecting or refracting circle and rays proceeding from a point; the curve in question, or rather a secondary caustic, is, as is well known, the Oval of Descartes or 'Cartesian:' the equation is discussed by a method which gives rise to some forms of the curve which appear to have escaped the notice of geometers. By considering the caustic as the evolute of the secondary caustic, it is shown that the caustic in the general case of a reflecting or refracting circle and rays proceeding from a point is a curve of the sixth class only. The concluding part of the memoir treats of the curve which, when the incident rays are parallel, must be taken for the secondary caustic in the place of the Cartesian, which, for the particular case in question, passes off to infinity. In the course of the memoir, the author reproduces a theorem first given, he believes, by himself in the *Philosophical Magazine*, viz. that there are six different systems of a radiant point and refracting circle which give rise to identically the same caustic. The memoir is divided into sections, each of which is to a considerable extent intelligible by itself, and the subject of each section is for the most part explained by the introductory paragraph or paragraphs.

- III. "On the Figure, Dimensions, and Mean Specific Gravity of the Earth, as derived from the Ordnance Trigonometrical Survey of Great Britain and Ireland." Communicated by Lieut-Colonel JAMES, R.E., F.R.S., &c., Superintendent of the Ordnance Survey. Received April 30, 1856.

(Abstract.)

The Trigonometrical Survey of the United Kingdom commenced in the year 1784, under the immediate auspices of the Royal Society; the first base was traced by General Roy on the 16th of April of